

Benthic foraminifera in the plankton following storms: what does this mean for (palaeo)-ecological interpretations?

Malcolm Hart (1), Giulia Molina (2), Christopher Smart (1), and Claire Widdicombe (3)

(1) Plymouth University, School of Geography, Earth & Environmental Sciences, Plymouth PL4 8AA, United Kingdom (mhart@plymouth.ac.uk), (2) Faculdade de Oceanografia, Universidade do Estado do Rio de Janeiro (UERJ), Rua Sao Francisco Xavier 524, Rio de Janeiro RJ, CEP 20550-900, Brazil, (3) Plymouth Marine Laboratory, Prospect Place, Plymouth PL1 3DH, United Kingdom

The Western Channel Observatory was established by the Natural Environment Research Council (NERC), with Plymouth Marine Laboratory managing the two autonomous buoys that are located to the south of Plymouth in the English Channel (Stations L4 and E1): see Smyth et al. (2015). These two locations are now monitored continually and there is regular sampling of the water column and the sea floor at both locations. At Station L4, despite being in waters with a depth of 50 m, benthic foraminifera are regularly found in the surface water plankton samples. Some of these benthic foraminifera contain algal symbionts, indicating that they may be living at the time of capture. If benthic foraminifera can be entrained in the water column, while still living, then this provides a mechanism for ‘migration’ that is much more rapid and efficient than the rate at which protists could migrate within, or on, the sediment surface. Recolonization by foraminifera, following disturbance, could well be facilitated by this mechanism which has only rarely been reported in the literature (e.g., Murray, 1965). It is clearly limited to depths impacted by fair weather (~ 30 m) or storm wave base (80 – 100 m). Data gathered during winter 2015–2016 certainly indicate that, following storm events, the larger the number of benthic foraminifera in the plankton tows and the greater their overall size. Some of the individuals being observed appear to contain sediment, indicating that they have been picked up from the sediment surface and, despite their greater weight, have still been transported into the plankton. Using data from the nearby sea area, off-shore and within Plymouth Sound, we are trying to ascertain if the recorded assemblage is from the L4 area, or whether they have been transported out from shallower-water environments, possibly assisted by increased run-off caused by heavy rainfall (associated with the storms). Clearly, re-distribution of foraminifera in the environment might make subsequent interpretations of ecology less accurate, but in the fossil record such changes could go completely undetected and lead to considerable inaccuracy in the interpretation of palaeoecology.

Murray, J.W. 1965. Significance of benthic foraminiferids in plankton samples. *Journal of Paleontology*, 39, 156–157.

Smyth, T., Atkinson, A., Widdicombe, S., Frost, M., Allen, I., Fishwick, J., Queiros, A., Sims, D. & Barange, M. 2015. The Western Channel Observatory. *Progress in Oceanography*, 137, 335–341.